



PHENIX YAG LASER OPERATING PROCEDURE IN BUILDING 1008A

procedure name

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Procedure for Operating YAG Laser in Building 1008A

1.0 Purpose and Scope

The purpose of this document is to describe the safety issues pertaining to operating a Continuum Surelite II-10 Nd:YAG laser in building 1008A (also known as the PHENIX Counting House). This procedure applies in accordance with the **BNL Laser Controlled Area Standard Operating Procedure** which accompanies this document. The laser and its safety enclosures are also described in the accompanying memos and references.

2.0 Responsibilities

All personnel operating the laser are required to be properly trained as specified in this procedure. In addition, they are responsible to ensure that no unauthorized personnel are inside the room housing the laser (henceforth referred to as the “laser hut”) while the laser is in an open operating mode (see below), and to insure that the laser is left in a closed and interlocked mode for normal operations.

3.0 Precautions

The laser is potentially capable of delivering Class IV laser light, and as such, it has been installed inside a multiply interlocked enclosure to allow operation in certain work areas as a Class I device. The laser shall only be operated in the designated laser hut in building 1008A. Operations in other locations will require the approval of the RHIC ES&H Coordinator and the Laser Safety Officer. The laser hut will be posted indicating the type, class and power of the laser inside, and that entry is permitted only by authorized personnel while the laser is operated with the box open. These signs shall be approved by the BNL Laser Safety Officer.

4.0 Prerequisites

The laser shall only be operated by authorized personnel. To be authorized, you must pass the BNL Laser Safety Training Course (IND011), take the required eye exam, and receive instructions on the safety systems and use of this particular laser. A list of authorized operators will be posted outside the laser hut.

5.0 Required equipment

Laser safety goggles which are approved for use with Nd:YAG lasers operating at the primary, secondary and third harmonic wavelengths (optical density greater than 7 at 1064 nm, 532 nm and 355 nm) must be worn inside the laser hut at all times whenever the box is open and the laser is capable of emission. Specifications for these goggles are given in the Standard Operating Procedure.

6.0 Procedure

The startup and operating procedure for the laser is described in the Surelite II-10 operating manual supplied by the manufacturer (see Ref.1) and the laser shall be operated in accordance with this procedure at all times.

Normal operation of the laser for the purpose of calibrating the PHENIX electromagnetic calorimeter, beam-beam, and time-of-flight detectors does not require opening the interlocked box, which serves as a safety enclosure for both the laser and the internal beam splitter optics, and is considered a Class I mode of operation (all beams fully enclosed). In normal Class I operation, authorized users, such as the PHENIX Shift Crew, may perform simple operations using the laser. These operations are limited to those listed in the Standard Operating Procedure.

In order to make adjustments to the optics *inside* the laser box while the laser is running, the laser hut must be cleared of all unauthorized personnel. The operator must notify any personnel working in the area that the laser is being operated in an open mode inside the room. A watch person must be stationed outside the hut to prevent any unauthorized personnel from entering the hut when the box is open. The watch person must also insure that no one is working overhead who could inadvertently be exposed to any laser emission.

In order to make adjustments to the laser or optics inside the laser box when the laser is running, part of the normal safety interlock system must be bypassed. All such bypasses shall be removed and the laser returned to its normal interlocked state before the laser is operated in its normal operating mode. All active fiber outputs from the box shall be connected or capped.

7.0 Safety and interlock system

The safety and interlock system for the laser box is integrated into the safety and interlock system of the laser itself supplied by the manufacturer. The system is designed such that the internal shutter inside the laser cavity drops into place whenever the box is opened and prevents the laser from firing.

Verification that the internal shutter drops into place when the lid is opened and no light is emanating from the laser shall be done using a light sensitive photodiode inside the laser box according to the procedure described in the Standard Operating Procedure. The system shall be tested every six months to insure that it is functioning correctly, and the results of the tests will be recorded in a logbook located in close proximity to the laser.

8.0 References

8.1 Continuum Surelite II-10 Operators Manual

9.0 Attachments

9.1 BNL Laser Controlled Area Standard Operating Procedure (ESH-0002)

9.2 Memo dated August 10, 1998

9.3 Memo dated August 6, 1998

9.4 Memo dated September 12, 1996

9.4 Drawing of laser box dated August 19, 1996